



# Full wwPDB EM Validation Report ⓘ

Oct 14, 2024 – 04:54 PM EDT

PDB ID : 8UB9  
EMDB ID : EMD-42079  
Title : Diversity-generating retroelement (DGR) ribonucleoprotein reverse transcriptase- Active state (N-empty) 1a  
Authors : Biswas, T.; Handa, S.; Ghosh, P.  
Deposited on : 2023-09-22  
Resolution : 3.07 Å(reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

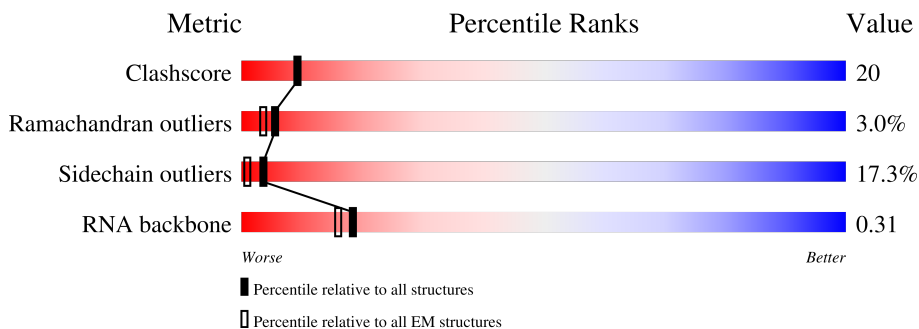
EMDB validation analysis : 0.0.1.dev113  
MolProbity : 4.02b-467  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:  
*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.07 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



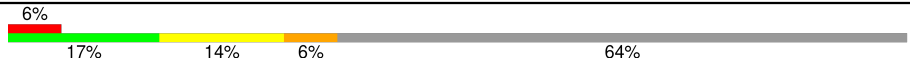

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	328	
2	B	290	
2	C	290	
2	D	290	
2	E	290	
2	F	290	
3	G	19	

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Mol	Chain	Length	Quality of chain
4	H	36	
5	I	140	

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 10370 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Reverse transcriptase.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	328	2690	1723	495	463	9	0	0

- Molecule 2 is a protein called Avd.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	122	976	631	172	166	7	0	0
2	C	111	888	578	157	148	5	0	0
2	D	111	888	577	161	145	5	0	0
2	E	110	876	569	156	146	5	0	0
2	F	111	888	577	161	145	5	0	0

- Molecule 3 is a RNA chain called Diversity-generating retroelement (DGR) RNA avd.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	G	13	289	127	58	91	13	0	0

- Molecule 4 is a RNA chain called Diversity-generating retroelement (DGR) RNA TR.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
4	H	13	270	121	44	92	13	0	0

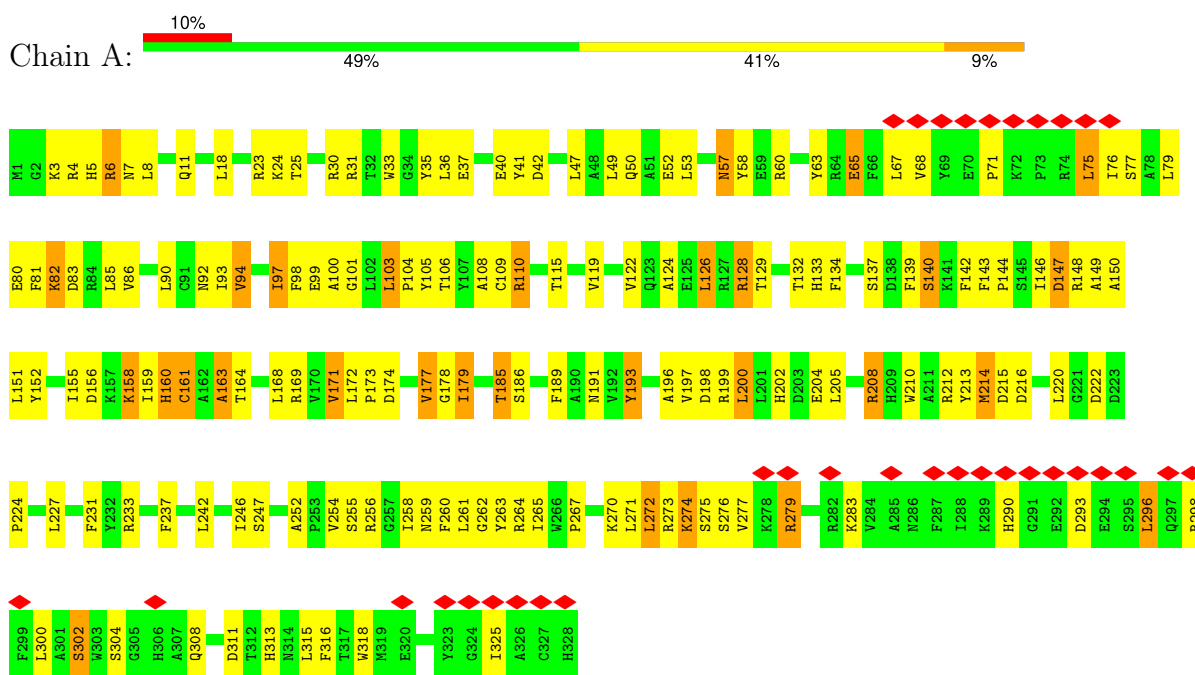
- Molecule 5 is a RNA chain called Diversity-generating retroelement (DGR) RNA Sp.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
5	I	122	2605	1161	464	858	122	0	0

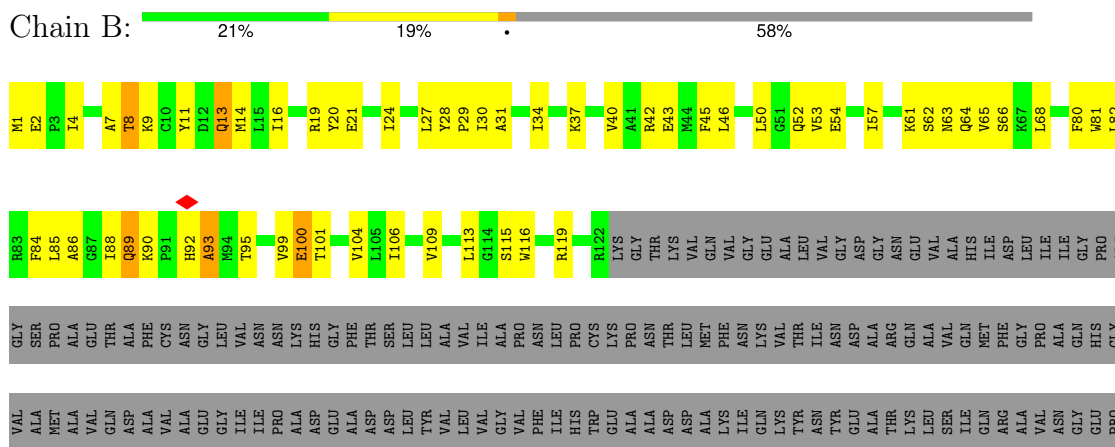
### 3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Reverse transcriptase



- Molecule 2: Avd





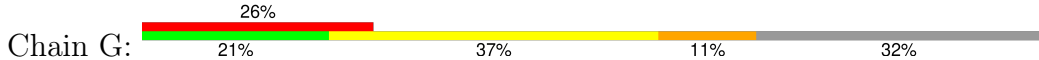
ILE ASP LEU LEU ILE ILE GLY PRO ARG GLY SER SER PRO ALA ALA GLU THR PHE ALA CYS ASN GLY LEU VAL ASN ASN LEU PHE LYS HIS GLY	MET PHE GLY PRO VAL GLN GLY HIS GLY VAL ALA SER MET VAL VAL GLN ASP ALA VAL ALA SER GLY LEU ILE ILE PRO PHE ALA ASP GLY ALA ALA ALA	GLN ARG ALA VAL ASN GLY GLU PRO LYS ALA SER SER VAL VAL THR GLN GLN ALA VAL ARG LYS SER ALA THR HIS HIS PRO PHE ALA ALA ALA
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● Molecule 2: Avd



MET GLU ILE LEU GLY ALA THR LYS CYS TYR ASP Q13 M14 L15 I16 R22 V23 T24 S25 V26 L27 I30 A31 Q32 S33 I34 P35 R36 K37 H38 V40 M41 R42 E43 F44 F45 L49 L50 V53 E54 L55 F56 R61 S62 M63 R64 V65 S66 R67 L68 A71	L75 F80 W81 L82 R83 F84 L85 I88 Q89 R90 P91 H92 A93 M94 T95 V99 E100 Q103 V104 L105 E108 R111 I112 L113 W116 R119 V120 M121 K123	ILE ILE GLY PRO ARG GLY SER PRO ALA ALA GLU THR PHE CYS GLY LEU VAL ASN ASN LYS HIS ASP ASP LEU TYR VAL VAL VAL GLY ILE PHE ASN PRO ASP ASP LEU THR VAL MET PHE ASN LYS VAL VAL TYR THR VAL SER GLN MET PHE GLY	PRO ALA GLN HIS GLY VAL ALA MET VAL VAL GLN ASP ALA VAL ALA GLU GLY ILE ILE PRO PHE ALA ALA ASN ASP ASP TYR VAL VAL VAL GLY PHE ASN HIS TRP GLU ALA ALA ASP ASP ALA LYS ILE GLN LYS TYR ASN TYR GLU ALA ALA THR LYS GLN SER ILE GLN MET ARG ALA	VAL ASN GLY PRO LYS ALA SER VAL VAL THR GLU GLN ASP ALA VAL ARG SER SER THR HIS PRO PHE ALA ALA ASN ALA
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● Molecule 3: Diversity-generating retroelement (DGR) RNA avd



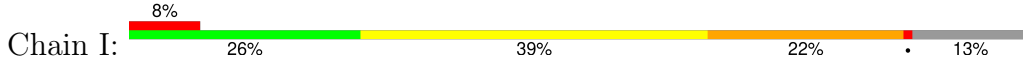
G369 G370 G371 G372 C373 A374 G375 G376 C377 U378 G379 G380 G381 A A A U U A A
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● Molecule 4: Diversity-generating retroelement (DGR) RNA TR



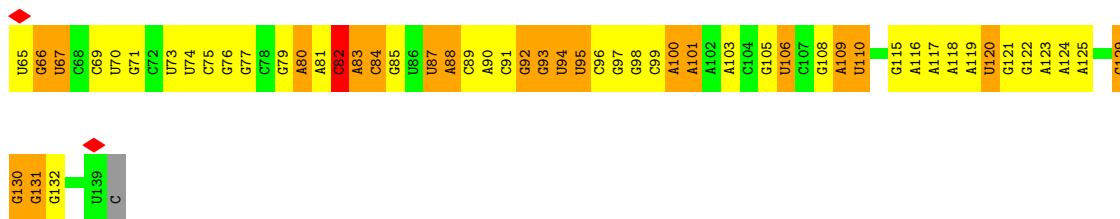
C C C D C C D C G C C C C C C C C C C G117 C121 C122 C125 A126 C127 C128 U129 C C D D D C
---

● Molecule 5: Diversity-generating retroelement (DGR) RNA Sp



C A U3 G4 G5 C6 U7 C8 U9 G10 A13 A14 C15 G16 C17 U18 U19 C20 G21 G22 C23 U24 U25 G26 G27 C28 G29 U33 G C G C C U U U U C C U U C A A U47 A48 G49 G50 G53 U54 C55 A56 G C C59 G60 G61 U62 U63 C64
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## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	148084	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	55	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.605	Depositor
Minimum map value	-0.927	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.031	Depositor
Recommended contour level	0.2	Depositor
Map size ( $\text{\AA}$ )	320.0, 320.0, 320.0	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.0, 1.0, 1.0	Depositor

## 5 Model quality i

### 5.1 Standard geometry i

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.52	0/2761	0.72	0/3731
2	B	0.54	0/996	0.63	0/1345
2	C	0.54	0/907	0.74	1/1226 (0.1%)
2	D	0.53	0/906	0.64	0/1222
2	E	0.53	0/894	0.63	0/1208
2	F	0.54	0/906	0.64	0/1222
3	G	0.94	2/324 (0.6%)	0.81	0/506
4	H	0.62	0/299	0.97	1/462 (0.2%)
5	I	0.69	0/2909	1.08	4/4529 (0.1%)
All	All	0.59	2/10902 (0.0%)	0.83	6/15451 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	G	378	U	O3'-P	-12.73	1.45	1.61
3	G	371	G	O3'-P	6.35	1.68	1.61

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	I	67	U	P-O3'-C3'	-10.14	107.53	119.70
5	I	24	U	P-O3'-C3'	-10.02	107.68	119.70
2	C	91	PRO	N-CA-CB	-7.74	94.01	103.30
5	I	82	C	P-O3'-C3'	-6.00	112.50	119.70
4	H	117	G	P-O3'-C3'	-5.50	113.10	119.70
5	I	25	U	P-O3'-C3'	-5.31	113.33	119.70

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2690	0	2686	147	0
2	B	976	0	1014	58	0
2	C	888	0	923	55	0
2	D	888	0	936	40	0
2	E	876	0	914	42	0
2	F	888	0	936	38	0
3	G	289	0	143	7	0
4	H	270	0	141	7	0
5	I	2605	0	1317	85	0
All	All	10370	0	9010	379	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 20.

All (379) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:90:LYS:HE2	2:C:90:LYS:H	1.30	0.96
2:E:86:ALA:HB2	2:E:99:VAL:HG21	1.57	0.83
5:I:92:G:H3'	5:I:93:G:H4'	1.61	0.83
1:A:168:LEU:HD22	1:A:189:PHE:HZ	1.46	0.80
5:I:82:C:H1'	5:I:84:C:C4	2.17	0.80
1:A:4:ARG:O	1:A:160:HIS:HB2	1.82	0.79
5:I:80:A:N7	5:I:81:A:N6	2.30	0.79
1:A:6:ARG:NH1	5:I:122:G:N7	2.32	0.78
1:A:147:ASP:HB2	1:A:193:TYR:OH	1.83	0.78
2:D:75:LEU:HD22	2:D:106:ILE:HG23	1.64	0.77
2:C:38:HIS:CE1	2:C:90:LYS:HB2	2.21	0.76
1:A:163:ALA:HB2	5:I:120:U:O4	1.85	0.76
2:C:25:SER:HA	2:D:88:ILE:HG23	1.68	0.76
2:C:35:PRO:HG2	2:C:91:PRO:HB3	1.67	0.75
2:F:23:VAL:HG22	2:F:105:LEU:HB3	1.69	0.74
1:A:279:ARG:HH12	5:I:54:U:H5'	1.53	0.73
2:D:16:ILE:HG12	2:D:109:VAL:HG23	1.69	0.73
1:A:315:LEU:HD12	5:I:83:A:C4	2.23	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:75:LEU:HD21	2:E:109:VAL:HG23	1.70	0.72
1:A:36:LEU:HB3	2:B:14:MET:HB3	1.72	0.71
1:A:159:ILE:O	1:A:161:CYS:N	2.25	0.70
1:A:302:SER:CB	5:I:53:G:H1'	2.21	0.70
2:E:53:VAL:HG21	2:F:80:PHE:CZ	2.26	0.69
2:F:32:GLN:O	5:I:4:G:N2	2.24	0.69
4:H:126:A:H61	5:I:48:A:H61	1.40	0.69
2:B:53:VAL:HG21	2:C:80:PHE:CZ	2.27	0.69
1:A:11:GLN:HB2	1:A:93:ILE:HG12	1.72	0.68
2:B:43:GLU:HA	2:C:40:VAL:HG21	1.74	0.68
2:B:86:ALA:HB2	2:B:99:VAL:HG21	1.75	0.68
2:E:13:GLN:HB3	2:E:60:GLY:HA3	1.74	0.68
2:E:98:GLN:NE2	5:I:17:C:O3'	2.27	0.67
5:I:108:G:H3'	5:I:109:A:H5''	1.75	0.67
1:A:213:TYR:CD1	1:A:261:LEU:HD21	2.29	0.67
2:C:90:LYS:O	2:C:91:PRO:C	2.34	0.66
1:A:146:ILE:HG12	1:A:193:TYR:CD2	2.30	0.66
2:C:82:LEU:HD22	2:C:94:MET:SD	2.36	0.66
1:A:140:SER:HA	1:A:247:SER:HB3	1.77	0.66
1:A:262:GLY:HA2	1:A:273:ARG:HE	1.61	0.66
1:A:264:ARG:N	1:A:271:LEU:O	2.25	0.66
1:A:205:LEU:HD21	1:A:233:ARG:HG2	1.77	0.65
5:I:82:C:H4'	5:I:83:A:OP1	1.96	0.65
3:G:373:C:H1'	5:I:82:C:OP1	1.97	0.65
1:A:115:THR:HG23	1:A:261:LEU:HD22	1.79	0.64
2:F:75:LEU:HD12	2:F:113:LEU:HD12	1.79	0.64
1:A:274:LYS:HE2	5:I:81:A:C2	2.32	0.64
1:A:313:HIS:HB3	5:I:88:A:H5'	1.79	0.63
4:H:126:A:H61	5:I:48:A:N6	1.95	0.63
1:A:258:ILE:HG22	1:A:260:PHE:HB2	1.81	0.62
2:E:53:VAL:HG11	2:F:80:PHE:CG	2.35	0.62
2:B:34:ILE:O	2:B:42:ARG:NH1	2.33	0.61
1:A:124:ALA:HB1	1:A:128:ARG:HH11	1.64	0.61
1:A:200:LEU:HD13	1:A:237:PHE:CD1	2.36	0.61
5:I:70:U:H4'	5:I:71:G:C8	2.35	0.61
1:A:104:PRO:HG3	5:I:130:G:H4'	1.83	0.61
2:E:53:VAL:HG11	2:F:80:PHE:CD1	2.35	0.61
2:C:93:ALA:O	2:C:94:MET:C	2.38	0.61
2:B:50:LEU:HD21	2:C:84:PHE:CE1	2.36	0.61
1:A:213:TYR:CG	1:A:261:LEU:HD21	2.36	0.60
5:I:80:A:C4	5:I:81:A:N7	2.68	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:100:ALA:O	5:I:105:G:H4'	2.02	0.60
1:A:279:ARG:NH1	5:I:54:U:H5'	2.17	0.60
1:A:168:LEU:HD22	1:A:189:PHE:CZ	2.32	0.60
1:A:18:LEU:HD13	1:A:50:GLN:HB2	1.83	0.60
2:B:40:VAL:HG23	5:I:4:G:N7	2.17	0.59
2:C:17:VAL:O	2:C:21:GLU:HG2	2.02	0.59
1:A:53:LEU:HD23	1:A:58:TYR:HB2	1.85	0.59
1:A:179:ILE:HG23	1:A:186:SER:HB3	1.83	0.59
2:C:91:PRO:O	2:C:92:HIS:HB2	2.01	0.59
2:D:27:LEU:HD23	2:D:30:ILE:HD12	1.85	0.59
2:F:35:PRO:HG3	2:F:92:HIS:CG	2.38	0.59
1:A:79:LEU:HB3	1:A:83:ASP:HB2	1.84	0.58
2:F:36:ARG:HB2	5:I:5:G:OP1	2.04	0.58
1:A:115:THR:HA	1:A:261:LEU:HD13	1.85	0.58
2:B:53:VAL:HG11	2:C:80:PHE:CG	2.38	0.58
2:B:31:ALA:HB2	2:B:45:PHE:CE2	2.38	0.58
1:A:196:ALA:HB3	1:A:242:LEU:HD11	1.86	0.57
1:A:277:VAL:HG13	1:A:315:LEU:HD11	1.84	0.57
5:I:100:A:O2'	5:I:101:A:OP2	2.19	0.57
1:A:128:ARG:NH1	5:I:95:U:OP1	2.36	0.57
2:B:28:TYR:CE1	2:B:50:LEU:HD11	2.40	0.57
1:A:265:ILE:HG12	1:A:270:LYS:HG3	1.86	0.57
2:C:87:GLY:O	2:C:88:ILE:C	2.42	0.57
2:B:53:VAL:HG11	2:C:80:PHE:CD1	2.40	0.57
1:A:41:TYR:CZ	2:C:79:ARG:HD3	2.41	0.56
2:C:90:LYS:HB3	2:C:91:PRO:HD2	1.86	0.56
2:F:27:LEU:HG	2:F:45:PHE:HZ	1.71	0.56
1:A:36:LEU:HD12	2:B:11:TYR:CE1	2.40	0.56
1:A:106:THR:OG1	1:A:198:ASP:OD2	2.22	0.56
1:A:155:ILE:HG22	1:A:155:ILE:O	2.06	0.56
1:A:273:ARG:NH2	5:I:56:A:OP1	2.38	0.56
2:F:68:LEU:HD21	2:F:116:TRP:CD2	2.40	0.56
1:A:126:LEU:HD13	1:A:220:LEU:HD22	1.87	0.56
5:I:80:A:C5	5:I:81:A:N6	2.74	0.56
1:A:58:TYR:CE2	1:A:86:VAL:HG11	2.40	0.56
2:C:90:LYS:O	2:C:92:HIS:N	2.38	0.56
1:A:148:ARG:HG2	1:A:173:PRO:O	2.07	0.55
2:B:89:GLN:HG2	2:B:93:ALA:HB2	1.88	0.55
3:G:372:G:N2	5:I:81:A:O2'	2.39	0.55
1:A:124:ALA:HB2	5:I:94:U:H1'	1.87	0.55
2:D:17:VAL:O	2:D:21:GLU:HG2	2.06	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:43:GLU:HG2	2:E:40:VAL:HG22	1.88	0.55
1:A:103:LEU:HD23	1:A:104:PRO:HD2	1.88	0.55
2:D:31:ALA:HB2	2:D:45:PHE:CE2	2.42	0.55
1:A:58:TYR:CE1	1:A:86:VAL:HG21	2.41	0.55
2:B:27:LEU:HD23	2:B:30:ILE:HD11	1.88	0.55
1:A:31:ARG:O	2:B:11:TYR:OH	2.24	0.55
1:A:122:VAL:HG21	1:A:260:PHE:CD2	2.42	0.55
2:B:84:PHE:CE1	2:F:50:LEU:HD21	2.41	0.55
1:A:41:TYR:CE2	2:C:79:ARG:HD3	2.42	0.54
1:A:302:SER:HB2	5:I:53:G:H1'	1.89	0.54
2:F:34:ILE:O	2:F:42:ARG:NH1	2.39	0.54
1:A:208:ARG:HG2	5:I:130:G:OP1	2.07	0.54
2:C:86:ALA:HB2	2:C:99:VAL:HG21	1.89	0.54
1:A:158:LYS:NZ	5:I:106:U:OP1	2.34	0.54
2:C:88:ILE:HG13	2:C:88:ILE:O	2.08	0.54
1:A:313:HIS:ND1	5:I:88:A:O4'	2.41	0.53
2:C:31:ALA:HB2	2:C:45:PHE:CE2	2.43	0.53
1:A:159:ILE:C	1:A:161:CYS:H	2.12	0.53
1:A:274:LYS:HE2	5:I:81:A:N1	2.24	0.53
2:C:68:LEU:HD11	2:C:120:VAL:HG21	1.90	0.53
1:A:263:TYR:HA	1:A:272:LEU:HA	1.91	0.53
2:D:113:LEU:O	2:D:117:ILE:HG12	2.09	0.53
2:E:82:LEU:HB3	2:E:99:VAL:HG13	1.89	0.53
1:A:202:HIS:HD1	1:A:210:TRP:HE1	1.56	0.53
2:D:82:LEU:HD11	2:D:106:ILE:HD12	1.90	0.53
1:A:3:LYS:HD3	5:I:109:A:C2	2.44	0.52
1:A:151:LEU:HD21	1:A:189:PHE:HB3	1.91	0.52
1:A:33:TRP:HH2	2:B:9:LYS:HB2	1.74	0.52
1:A:133:HIS:CD2	1:A:224:PRO:HB3	2.43	0.52
1:A:53:LEU:HD21	1:A:86:VAL:HG22	1.91	0.52
1:A:134:PHE:CE2	1:A:252:ALA:HB3	2.45	0.52
2:B:88:ILE:HG23	2:F:25:SER:HA	1.91	0.52
2:B:101:THR:HG21	4:H:126:A:H4'	1.92	0.52
2:E:94:MET:HE2	2:E:99:VAL:HG22	1.90	0.52
2:F:31:ALA:HB2	2:F:45:PHE:CE2	2.45	0.52
1:A:108:ALA:HB2	1:A:214:MET:H	1.73	0.52
5:I:121:G:H2'	5:I:122:G:O4'	2.10	0.52
1:A:8:LEU:HB3	1:A:93:ILE:HG21	1.93	0.51
1:A:231:PHE:HE1	1:A:246:ILE:HG21	1.76	0.51
2:C:43:GLU:HG3	2:C:44:MET:N	2.25	0.51
4:H:126:A:N1	5:I:48:A:N1	2.58	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:260:PHE:HB3	1:A:265:ILE:HD12	1.92	0.51
2:D:28:TYR:CZ	2:E:88:ILE:HD11	2.46	0.51
1:A:98:PHE:CZ	1:A:155:ILE:HA	2.45	0.51
2:E:34:ILE:HG12	2:E:93:ALA:HB1	1.92	0.51
1:A:5:HIS:HB3	1:A:8:LEU:HD21	1.93	0.51
1:A:172:LEU:HD11	1:A:179:ILE:HG12	1.92	0.51
1:A:152:TYR:CE2	1:A:172:LEU:HD23	2.46	0.51
1:A:160:HIS:CD2	5:I:110:U:C2	2.99	0.51
2:C:59:ALA:HB1	2:C:68:LEU:HD23	1.91	0.51
1:A:63:TYR:HB3	1:A:77:SER:HB2	1.93	0.51
1:A:122:VAL:O	1:A:126:LEU:HB2	2.11	0.51
2:B:45:PHE:CD2	2:B:85:LEU:HD11	2.46	0.51
2:B:61:LYS:HG3	2:C:73:ALA:HA	1.93	0.51
1:A:231:PHE:CE1	1:A:246:ILE:HG21	2.46	0.50
1:A:65:GLU:HA	1:A:77:SER:HA	1.94	0.50
1:A:33:TRP:HH2	2:B:9:LYS:CB	2.24	0.50
1:A:94:VAL:O	1:A:97:ILE:HG12	2.12	0.50
1:A:8:LEU:HB2	1:A:164:THR:OG1	2.11	0.50
1:A:108:ALA:O	1:A:110:ARG:N	2.44	0.50
2:B:68:LEU:HD21	2:B:116:TRP:CD2	2.47	0.50
2:E:92:HIS:CD2	5:I:19:A:C6	2.99	0.50
3:G:372:G:H2'	3:G:373:C:C6	2.47	0.50
2:B:7:ALA:O	2:B:61:LYS:HE3	2.12	0.49
1:A:76:ILE:HG21	4:H:117:G:C4	2.47	0.49
1:A:198:ASP:CG	1:A:212:ARG:HE	2.16	0.49
2:F:82:LEU:HB3	2:F:99:VAL:HG13	1.94	0.49
2:B:68:LEU:HD21	2:B:116:TRP:CE2	2.47	0.49
1:A:147:ASP:HB3	1:A:150:ALA:H	1.76	0.49
1:A:308:GLN:HE22	4:H:122:C:H5''	1.77	0.49
2:C:64:GLN:HB3	2:C:67:LYS:HG2	1.95	0.49
5:I:83:A:H2'	5:I:84:C:C5	2.48	0.49
1:A:172:LEU:HD22	1:A:189:PHE:HD2	1.77	0.48
2:B:16:ILE:HD11	2:B:113:LEU:HB2	1.93	0.48
2:C:82:LEU:HD11	2:C:106:ILE:HD12	1.95	0.48
3:G:379:G:C6	5:I:60:G:C6	3.01	0.48
2:E:37:LYS:HA	5:I:7:U:O4'	2.12	0.48
1:A:139:PHE:HB2	1:A:215:ASP:HB2	1.94	0.48
2:E:52:GLN:OE1	2:E:75:LEU:HD13	2.12	0.48
2:E:31:ALA:HB2	2:E:45:PHE:CE2	2.48	0.48
5:I:69:C:O2'	5:I:70:U:H5'	2.14	0.48
2:C:85:LEU:O	2:C:88:ILE:HG12	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:50:LEU:HD21	2:E:84:PHE:CZ	2.49	0.48
1:A:25:THR:OG1	1:A:85:LEU:HA	2.13	0.48
2:F:90:LYS:HD2	2:F:91:PRO:HD2	1.94	0.48
1:A:304:SER:HA	1:A:316:PHE:HZ	1.79	0.48
2:C:35:PRO:O	2:C:38:HIS:N	2.47	0.48
2:D:31:ALA:O	2:D:42:ARG:HG3	2.14	0.48
5:I:124:A:H2'	5:I:125:A:C8	2.49	0.47
1:A:101:GLY:HA2	5:I:105:G:O3'	2.14	0.47
2:D:45:PHE:CD2	2:D:85:LEU:HD11	2.49	0.47
2:E:89:GLN:HB3	2:E:91:PRO:HD2	1.96	0.47
2:E:52:GLN:HG2	2:E:55:LEU:HD12	1.97	0.47
1:A:8:LEU:HD12	1:A:159:ILE:HG23	1.95	0.47
2:B:13:GLN:HE21	2:B:61:LYS:HD3	1.79	0.47
2:B:28:TYR:HB3	2:B:29:PRO:HD3	1.95	0.47
2:F:37:LYS:HE3	2:F:38:HIS:NE2	2.29	0.47
2:F:68:LEU:HD21	2:F:116:TRP:CE2	2.50	0.47
2:B:46:LEU:HD23	2:B:46:LEU:HA	1.64	0.47
2:C:35:PRO:O	2:C:36:ARG:C	2.52	0.47
2:F:27:LEU:HD12	2:F:30:ILE:HD11	1.95	0.47
2:B:13:GLN:NE2	2:B:61:LYS:HD3	2.30	0.47
2:D:53:VAL:HG11	2:E:80:PHE:CG	2.49	0.47
2:D:68:LEU:HD13	2:D:68:LEU:HA	1.78	0.47
5:I:90:A:H2'	5:I:91:C:O4'	2.15	0.47
5:I:91:C:H2'	5:I:92:G:C8	2.50	0.47
5:I:95:U:H2'	5:I:96:C:C6	2.50	0.47
2:D:53:VAL:HG21	2:E:80:PHE:CZ	2.50	0.47
2:E:26:TYR:CE2	2:E:101:THR:HB	2.50	0.47
2:B:13:GLN:HG3	2:B:14:MET:N	2.30	0.47
1:A:57:ASN:HD22	1:A:57:ASN:HA	1.48	0.46
2:D:54:GLU:OE1	2:E:77:MET:HB2	2.16	0.46
1:A:296:LEU:HD21	1:A:325:ILE:HG21	1.95	0.46
1:A:103:LEU:HD12	1:A:199:ARG:HG2	1.97	0.46
2:C:16:ILE:HD13	2:C:112:ILE:HB	1.97	0.46
2:D:82:LEU:HB3	2:D:99:VAL:HG13	1.98	0.46
2:E:24:ILE:HD11	2:E:53:VAL:CG2	2.46	0.46
5:I:80:A:C5	5:I:81:A:N7	2.84	0.46
1:A:90:LEU:HD13	1:A:168:LEU:HD23	1.97	0.46
1:A:315:LEU:HA	5:I:83:A:H4'	1.97	0.46
1:A:318:TRP:CD2	5:I:83:A:H5'	2.51	0.46
2:B:81:TRP:HH2	2:F:50:LEU:HD13	1.81	0.46
5:I:80:A:N7	5:I:81:A:C6	2.84	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:31:ALA:HB2	2:B:45:PHE:HE2	1.77	0.46
2:E:20:TYR:HA	2:E:109:VAL:HG11	1.98	0.46
1:A:108:ALA:HB3	1:A:191:ASN:OD1	2.16	0.46
2:B:16:ILE:HG12	2:B:109:VAL:HG13	1.98	0.46
2:F:85:LEU:HD23	2:F:88:ILE:HD12	1.97	0.46
2:B:82:LEU:HD11	2:B:106:ILE:HD12	1.97	0.46
1:A:259:ASN:ND2	5:I:79:G:OP1	2.48	0.45
2:B:50:LEU:HD21	2:C:84:PHE:CZ	2.51	0.45
2:C:90:LYS:HE2	2:C:90:LYS:N	2.13	0.45
2:E:13:GLN:HG3	2:E:14:MET:N	2.32	0.45
2:C:40:VAL:HA	2:C:43:GLU:HG2	1.97	0.45
2:F:27:LEU:HD12	2:F:27:LEU:HA	1.77	0.45
5:I:70:U:H5''	5:I:71:G:O4'	2.17	0.45
1:A:134:PHE:CD1	1:A:258:ILE:HG12	2.52	0.45
2:B:80:PHE:CE1	2:F:53:VAL:HG21	2.52	0.45
2:E:67:LYS:HZ3	2:E:67:LYS:HG3	1.71	0.45
2:D:38:HIS:NE2	2:D:91:PRO:HD2	2.32	0.45
2:E:12:ASP:O	2:E:16:ILE:HG13	2.16	0.45
2:F:27:LEU:HB3	2:F:49:LEU:HD22	1.99	0.45
3:G:370:G:N2	5:I:70:U:H1'	2.31	0.45
1:A:142:PHE:CD2	1:A:215:ASP:HB3	2.52	0.45
1:A:4:ARG:NH2	5:I:123:A:O5'	2.50	0.45
1:A:30:ARG:HA	1:A:35:TYR:CD2	2.52	0.45
1:A:202:HIS:NE2	5:I:129:G:O3'	2.50	0.45
2:D:24:ILE:HD11	2:D:53:VAL:CG2	2.47	0.45
1:A:82:LYS:HE2	1:A:82:LYS:HB2	1.52	0.44
2:C:68:LEU:HD12	2:C:117:ILE:HA	2.00	0.44
1:A:60:ARG:HD2	1:A:79:LEU:HD11	1.99	0.44
2:D:68:LEU:HB3	2:D:117:ILE:CD1	2.46	0.44
1:A:171:VAL:HG13	1:A:185:THR:HG21	1.99	0.44
1:A:213:TYR:CD2	1:A:261:LEU:HD11	2.52	0.44
2:B:20:TYR:CE2	2:B:52:GLN:HB3	2.53	0.44
2:E:17:VAL:HG12	2:E:21:GLU:OE2	2.17	0.44
5:I:20:C:H4'	5:I:21:G:O5'	2.17	0.44
2:F:56:PHE:CE1	2:F:71:ALA:HB1	2.52	0.44
2:E:67:LYS:H	2:E:67:LYS:HG2	1.65	0.44
2:B:8:THR:HG23	2:C:69:TYR:CE1	2.53	0.44
2:C:34:ILE:HG22	2:C:38:HIS:HB2	1.98	0.44
2:E:31:ALA:O	2:E:42:ARG:HG3	2.18	0.44
2:C:53:VAL:HG11	2:D:80:PHE:CG	2.53	0.44
2:F:122:ARG:HD2	2:F:122:ARG:HA	1.81	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:34:ILE:HB	2:C:42:ARG:HB2	2.00	0.44
2:D:28:TYR:CD2	2:E:84:PHE:HZ	2.35	0.44
2:E:106:ILE:HA	2:E:109:VAL:HG22	1.98	0.44
2:F:32:GLN:HG2	5:I:4:G:N1	2.33	0.44
2:F:68:LEU:HD23	2:F:68:LEU:HA	1.76	0.44
1:A:140:SER:HA	1:A:247:SER:CB	2.46	0.43
1:A:143:PHE:HB2	1:A:144:PRO:HD3	1.99	0.43
2:B:21:GLU:OE2	2:C:83:ARG:HD2	2.18	0.43
2:E:16:ILE:HG13	2:E:16:ILE:H	1.48	0.43
2:B:84:PHE:HA	2:B:88:ILE:HD12	2.00	0.43
2:F:108:GLU:O	2:F:112:ILE:HG13	2.19	0.43
1:A:311:ASP:O	5:I:87:U:H4'	2.18	0.43
2:B:28:TYR:CE1	2:C:84:PHE:HZ	2.37	0.43
3:G:371:G:C2	5:I:69:C:C2	3.06	0.43
5:I:80:A:H2'	5:I:81:A:C4	2.54	0.43
1:A:152:TYR:OH	1:A:168:LEU:O	2.36	0.43
1:A:169:ARG:HG2	1:A:174:ASP:HB2	2.01	0.43
1:A:254:VAL:HG12	1:A:267:PRO:HD3	2.00	0.43
2:E:46:LEU:HD23	2:E:46:LEU:HA	1.80	0.43
2:E:68:LEU:HD21	2:E:116:TRP:CE2	2.54	0.43
2:B:85:LEU:O	2:B:93:ALA:HB3	2.19	0.43
5:I:110:U:H2'	5:I:122:G:O6	2.18	0.43
2:C:94:MET:HG2	2:C:99:VAL:HG22	2.00	0.43
3:G:371:G:H21	5:I:81:A:H8	1.67	0.43
1:A:94:VAL:HG13	1:A:98:PHE:CE2	2.53	0.42
2:D:81:TRP:O	2:D:85:LEU:HG	2.18	0.42
2:F:123:LYS:H	2:F:123:LYS:HG2	1.35	0.42
1:A:132:THR:OG1	1:A:133:HIS:ND1	2.40	0.42
2:B:57:ILE:O	2:B:61:LYS:HG2	2.19	0.42
2:F:88:ILE:HG22	2:F:93:ALA:HA	2.01	0.42
5:I:115:G:N2	5:I:117:A:H3'	2.33	0.42
2:B:21:GLU:CD	2:C:83:ARG:HH11	2.22	0.42
1:A:179:ILE:HG23	1:A:186:SER:CB	2.49	0.42
2:B:82:LEU:HB3	2:B:99:VAL:HG13	2.00	0.42
2:C:16:ILE:HD13	2:C:16:ILE:HA	1.80	0.42
5:I:69:C:C2'	5:I:70:U:H5'	2.50	0.42
5:I:130:G:H8	5:I:130:G:OP2	2.02	0.42
1:A:47:LEU:HD23	1:A:47:LEU:HA	1.84	0.42
1:A:105:TYR:HB2	1:A:210:TRP:CH2	2.54	0.42
1:A:108:ALA:HB2	1:A:214:MET:N	2.33	0.42
5:I:16:G:N2	5:I:24:U:H1'	2.34	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:80:GLU:HB2	1:A:82:LYS:HG3	2.01	0.42
1:A:75:LEU:HD22	1:A:75:LEU:HA	1.72	0.42
1:A:272:LEU:HD12	5:I:83:A:N1	2.35	0.42
2:D:90:LYS:HD3	2:D:90:LYS:HA	1.79	0.42
2:D:106:ILE:HA	2:D:109:VAL:HG12	2.00	0.42
2:E:46:LEU:HB3	2:F:40:VAL:HG11	2.01	0.42
1:A:81:PHE:CE1	1:A:85:LEU:HD12	2.55	0.42
1:A:99:GLU:O	1:A:110:ARG:NH1	2.53	0.42
1:A:261:LEU:HA	1:A:261:LEU:HD23	1.72	0.42
1:A:263:TYR:CD1	1:A:263:TYR:N	2.87	0.42
2:B:24:ILE:HD11	2:B:53:VAL:CG2	2.49	0.42
2:B:80:PHE:CZ	2:F:53:VAL:HG21	2.55	0.42
2:F:37:LYS:HD2	5:I:25:U:O2'	2.19	0.42
1:A:52:GLU:OE1	2:B:1:MET:HB2	2.20	0.41
1:A:273:ARG:NH2	5:I:55:C:O3'	2.53	0.41
5:I:103:A:H61	5:I:130:G:H1	1.68	0.41
1:A:296:LEU:O	1:A:300:LEU:HB2	2.20	0.41
2:B:100:GLU:O	2:B:104:VAL:HG23	2.20	0.41
2:C:35:PRO:HG2	2:C:91:PRO:CB	2.45	0.41
2:C:100:GLU:O	2:C:104:VAL:HG23	2.20	0.41
2:D:94:MET:HG2	2:D:98:GLN:HB2	2.01	0.41
1:A:270:LYS:HE2	1:A:270:LYS:HB3	1.62	0.41
2:E:100:GLU:O	2:E:104:VAL:HG23	2.20	0.41
2:F:34:ILE:HG22	2:F:38:HIS:HB2	2.00	0.41
1:A:24:LYS:HD2	1:A:92:ASN:HD21	1.84	0.41
1:A:49:LEU:HD12	1:A:49:LEU:HA	1.89	0.41
1:A:155:ILE:HG22	1:A:168:LEU:HD13	2.02	0.41
1:A:155:ILE:CG2	1:A:168:LEU:HD13	2.50	0.41
2:B:80:PHE:CG	2:F:53:VAL:HG11	2.55	0.41
2:D:36:ARG:HB3	5:I:8:C:OP1	2.21	0.41
2:B:61:LYS:HG3	2:C:73:ALA:CA	2.50	0.41
2:D:68:LEU:HD11	2:D:116:TRP:CD2	2.55	0.41
2:D:91:PRO:O	2:D:93:ALA:N	2.53	0.41
2:F:80:PHE:O	2:F:83:ARG:HG2	2.20	0.41
1:A:159:ILE:HG13	1:A:168:LEU:HD11	2.01	0.41
2:B:81:TRP:O	2:B:85:LEU:HG	2.20	0.41
2:C:46:LEU:HA	2:C:46:LEU:HD23	1.78	0.41
2:D:68:LEU:HD11	2:D:116:TRP:CE3	2.56	0.41
5:I:66:G:C5	5:I:67:U:C4	3.09	0.41
2:D:75:LEU:HD23	2:D:75:LEU:HA	1.88	0.41
1:A:134:PHE:CE1	1:A:258:ILE:HG12	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:274:LYS:HE2	5:I:81:A:H2	1.83	0.41
2:B:27:LEU:O	2:B:31:ALA:N	2.51	0.41
2:D:30:ILE:HG21	2:D:94:MET:HG3	2.03	0.41
1:A:108:ALA:HA	1:A:213:TYR:CE2	2.55	0.41
2:B:27:LEU:HD11	2:B:82:LEU:HD21	2.02	0.41
2:C:26:TYR:O	2:C:30:ILE:HG12	2.21	0.41
2:C:35:PRO:O	2:C:37:LYS:N	2.54	0.41
2:D:52:GLN:HG2	2:D:55:LEU:HD12	2.03	0.41
2:D:102:ALA:HA	2:D:105:LEU:HD12	2.02	0.41
5:I:116:A:H2'	5:I:117:A:O4'	2.21	0.41
1:A:315:LEU:HG	5:I:83:A:O4'	2.20	0.41
2:E:96:PRO:O	2:E:100:GLU:HG3	2.21	0.41
1:A:119:VAL:HG11	1:A:263:TYR:CD1	2.56	0.40
2:B:68:LEU:HD23	2:B:68:LEU:HA	1.76	0.40
2:D:100:GLU:O	2:D:104:VAL:HG23	2.21	0.40
5:I:80:A:C2	5:I:81:A:N7	2.90	0.40
1:A:49:LEU:HD13	2:B:1:MET:HE3	2.03	0.40
2:C:56:PHE:CE1	2:C:71:ALA:HB1	2.57	0.40
2:C:89:GLN:H	2:C:89:GLN:HG3	1.50	0.40
2:D:87:GLY:HA2	2:D:92:HIS:ND1	2.36	0.40
4:H:125:C:O2	5:I:50:G:C2	2.75	0.40
2:C:24:ILE:HG22	2:D:88:ILE:HG21	2.02	0.40
2:C:57:ILE:HG21	2:D:76:ALA:HB3	2.03	0.40
2:E:35:PRO:HA	5:I:24:U:H5'	2.04	0.40
5:I:9:U:H2'	5:I:10:G:C8	2.56	0.40
1:A:8:LEU:HB3	1:A:93:ILE:CG2	2.51	0.40
1:A:104:PRO:HD3	5:I:131:G:C5	2.57	0.40
1:A:128:ARG:CZ	5:I:95:U:OP1	2.69	0.40
2:D:28:TYR:CE2	2:D:50:LEU:HD11	2.56	0.40
2:E:21:GLU:OE2	2:F:83:ARG:HD2	2.22	0.40
2:E:95:THR:HG21	5:I:18:U:H4'	2.04	0.40
1:A:262:GLY:HA2	1:A:273:ARG:NE	2.31	0.40
2:B:28:TYR:HE1	2:B:50:LEU:HD11	1.86	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	326/328 (99%)	272 (83%)	40 (12%)	14 (4%)	2	11
2	B	120/290 (41%)	108 (90%)	7 (6%)	5 (4%)	2	12
2	C	109/290 (38%)	94 (86%)	10 (9%)	5 (5%)	2	10
2	D	109/290 (38%)	99 (91%)	9 (8%)	1 (1%)	14	43
2	E	108/290 (37%)	99 (92%)	9 (8%)	0	100	100
2	F	109/290 (38%)	101 (93%)	7 (6%)	1 (1%)	14	43
All	All	881/1778 (50%)	773 (88%)	82 (9%)	26 (3%)	5	17

All (26) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	7	ASN
1	A	109	CYS
1	A	140	SER
2	C	88	ILE
2	C	91	PRO
2	C	92	HIS
1	A	149	ALA
1	A	160	HIS
1	A	163	ALA
1	A	222	ASP
1	A	255	SER
2	B	92	HIS
2	C	12	ASP
2	C	94	MET
2	D	92	HIS
1	A	40	GLU
1	A	177	VAL
1	A	214	MET
2	B	93	ALA
2	B	2	GLU

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Mol	Chain	Res	Type
2	B	63	ASN
1	A	193	TYR
2	B	4	ILE
1	A	178	GLY
1	A	71	PRO
2	F	90	LYS

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	278/278 (100%)	234 (84%)	44 (16%)	<b>2</b> <b>8</b>
2	B	102/232 (44%)	87 (85%)	15 (15%)	<b>2</b> <b>10</b>
2	C	92/232 (40%)	80 (87%)	12 (13%)	<b>3</b> <b>13</b>
2	D	92/232 (40%)	76 (83%)	16 (17%)	<b>1</b> <b>6</b>
2	E	91/232 (39%)	73 (80%)	18 (20%)	<b>1</b> <b>4</b>
2	F	92/232 (40%)	68 (74%)	24 (26%)	<b>0</b> <b>1</b>
All	All	747/1438 (52%)	618 (83%)	129 (17%)	<b>3</b> <b>6</b>

All (129) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	ARG
1	A	23	ARG
1	A	37	GLU
1	A	42	ASP
1	A	57	ASN
1	A	65	GLU
1	A	67	LEU
1	A	68	VAL
1	A	75	LEU
1	A	82	LYS
1	A	94	VAL
1	A	97	ILE

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	103	LEU
1	A	110	ARG
1	A	126	LEU
1	A	128	ARG
1	A	129	THR
1	A	137	SER
1	A	147	ASP
1	A	156	ASP
1	A	158	LYS
1	A	161	CYS
1	A	171	VAL
1	A	177	VAL
1	A	179	ILE
1	A	185	THR
1	A	197	VAL
1	A	200	LEU
1	A	204	GLU
1	A	208	ARG
1	A	216	ASP
1	A	227	LEU
1	A	256	ARG
1	A	272	LEU
1	A	274	LYS
1	A	275	SER
1	A	276	SER
1	A	279	ARG
1	A	283	LYS
1	A	290	HIS
1	A	293	ASP
1	A	296	LEU
1	A	298	ARG
1	A	302	SER
2	B	8	THR
2	B	13	GLN
2	B	19	ARG
2	B	37	LYS
2	B	54	GLU
2	B	62	SER
2	B	64	GLN
2	B	65	VAL
2	B	66	SER
2	B	89	GLN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	B	90	LYS
2	B	95	THR
2	B	100	GLU
2	B	115	SER
2	B	119	ARG
2	C	11	TYR
2	C	16	ILE
2	C	36	ARG
2	C	43	GLU
2	C	64	GLN
2	C	68	LEU
2	C	89	GLN
2	C	90	LYS
2	C	91	PRO
2	C	92	HIS
2	C	94	MET
2	C	95	THR
2	D	14	MET
2	D	15	LEU
2	D	18	GLU
2	D	36	ARG
2	D	52	GLN
2	D	62	SER
2	D	63	ASN
2	D	64	GLN
2	D	65	VAL
2	D	68	LEU
2	D	89	GLN
2	D	101	THR
2	D	103	GLN
2	D	119	ARG
2	D	122	ARG
2	D	123	LYS
2	E	13	GLN
2	E	16	ILE
2	E	36	ARG
2	E	43	GLU
2	E	50	LEU
2	E	52	GLN
2	E	62	SER
2	E	63	ASN
2	E	65	VAL

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Mol	Chain	Res	Type
2	E	66	SER
2	E	67	LYS
2	E	75	LEU
2	E	83	ARG
2	E	85	LEU
2	E	89	GLN
2	E	90	LYS
2	E	95	THR
2	E	113	LEU
2	F	13	GLN
2	F	14	MET
2	F	15	LEU
2	F	16	ILE
2	F	22	ARG
2	F	27	LEU
2	F	33	SER
2	F	36	ARG
2	F	43	GLU
2	F	54	GLU
2	F	55	LEU
2	F	61	LYS
2	F	65	VAL
2	F	66	SER
2	F	90	LYS
2	F	95	THR
2	F	100	GLU
2	F	103	GLN
2	F	105	LEU
2	F	111	ARG
2	F	113	LEU
2	F	119	ARG
2	F	122	ARG
2	F	123	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	57	ASN
1	A	308	GLN
2	C	13	GLN
2	C	121	ASN
2	D	13	GLN

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Mol	Chain	Res	Type
2	D	32	GLN
2	E	52	GLN
2	E	98	GLN
2	F	13	GLN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
3	G	12/19 (63%)	4 (33%)	0
4	H	12/36 (33%)	4 (33%)	0
5	I	119/140 (85%)	53 (44%)	4 (3%)
All	All	143/195 (73%)	61 (42%)	4 (2%)

All (61) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
3	G	374	A
3	G	375	G
3	G	376	G
3	G	379	G
4	H	121	C
4	H	126	A
4	H	127	C
4	H	128	C
5	I	4	G
5	I	5	G
5	I	6	C
5	I	7	U
5	I	8	C
5	I	9	U
5	I	13	A
5	I	14	A
5	I	15	C
5	I	20	C
5	I	21	G
5	I	22	G
5	I	27	G
5	I	28	C
5	I	29	G
5	I	33	U
5	I	53	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
5	I	56	A
5	I	61	G
5	I	63	U
5	I	65	U
5	I	66	G
5	I	73	U
5	I	74	U
5	I	75	C
5	I	76	G
5	I	77	G
5	I	80	A
5	I	82	C
5	I	83	A
5	I	84	C
5	I	85	G
5	I	87	U
5	I	88	A
5	I	89	C
5	I	92	G
5	I	93	G
5	I	94	U
5	I	95	U
5	I	97	G
5	I	98	G
5	I	99	C
5	I	101	A
5	I	106	U
5	I	109	A
5	I	110	U
5	I	118	A
5	I	119	A
5	I	120	U
5	I	129	G
5	I	130	G
5	I	131	G
5	I	132	G

All (4) RNA pucker outliers are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
5	I	20	C
5	I	83	A

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Mol	Chain	Res	Type
5	I	94	U
5	I	100	A

#### 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

#### 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

#### 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

#### 5.7 Other polymers [i](#)

There are no such residues in this entry.

#### 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

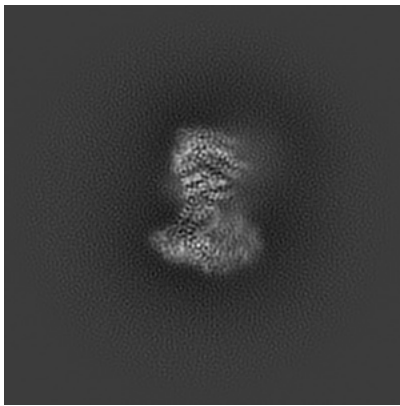
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-42079. These allow visual inspection of the internal detail of the map and identification of artifacts.

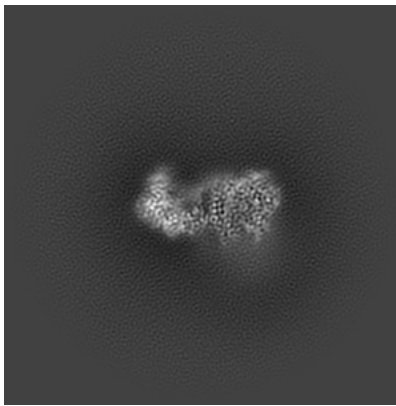
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

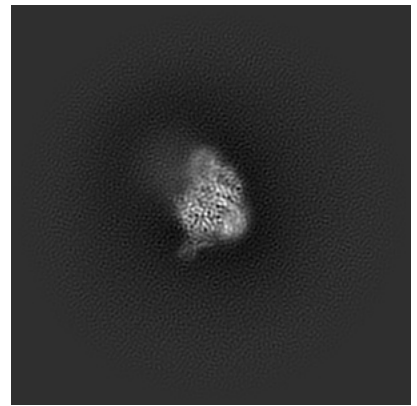
#### 6.1.1 Primary map



X

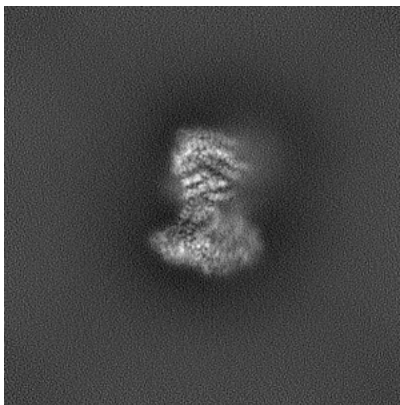


Y

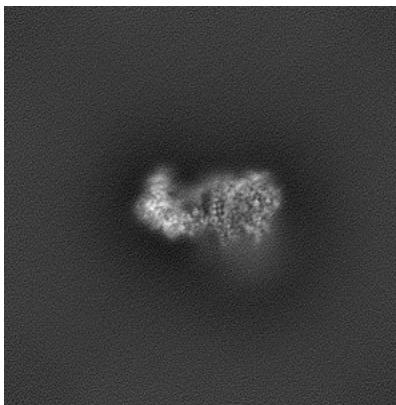


Z

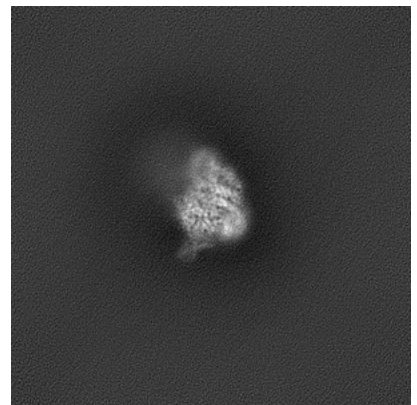
#### 6.1.2 Raw map



X



Y

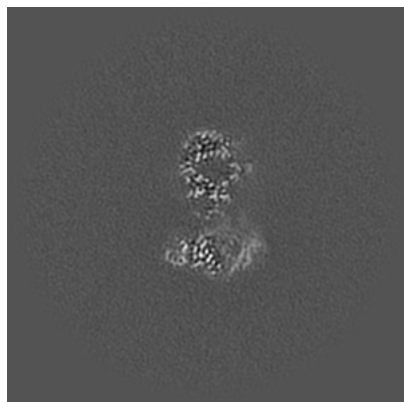


Z

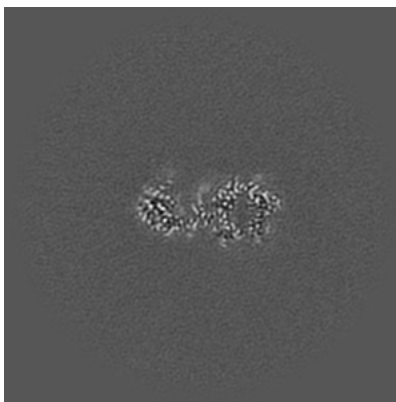
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

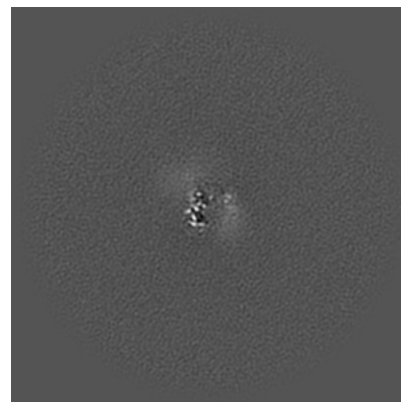
### 6.2.1 Primary map



X Index: 160

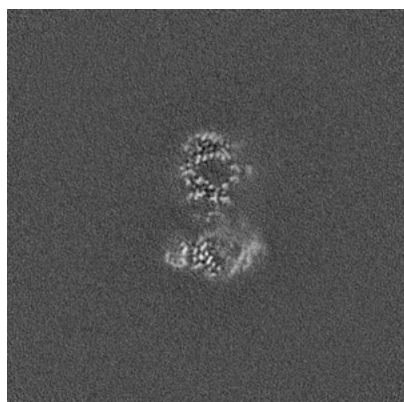


Y Index: 160

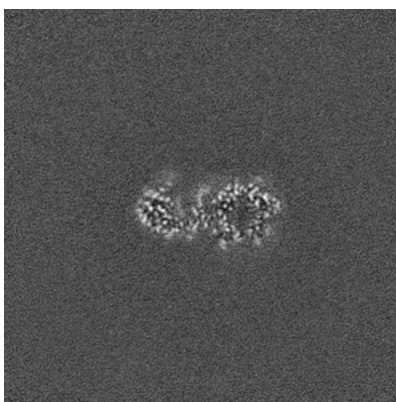


Z Index: 160

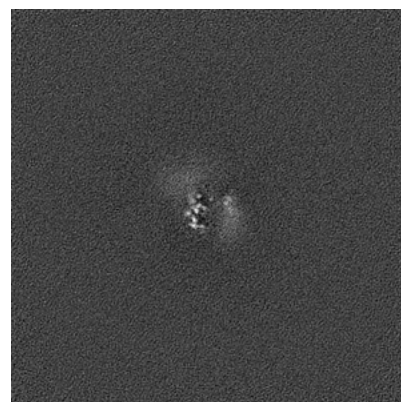
### 6.2.2 Raw map



X Index: 160



Y Index: 160



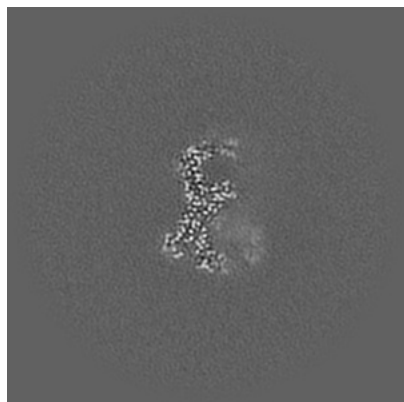
Z Index: 160

The images above show central slices of the map in three orthogonal directions.

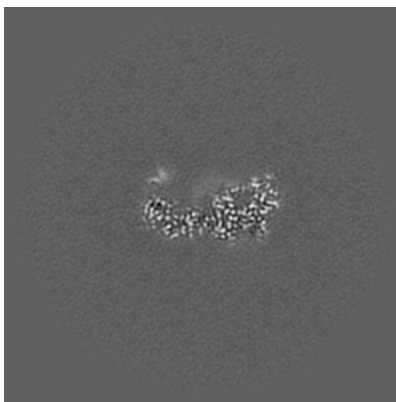


## 6.3 Largest variance slices [i](#)

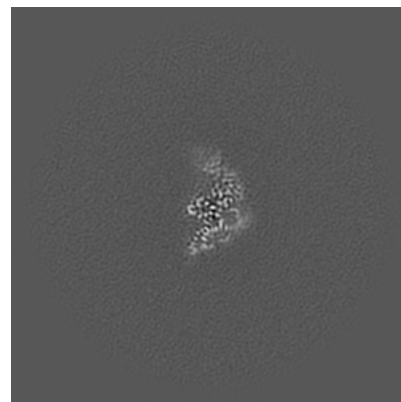
### 6.3.1 Primary map



X Index: 150

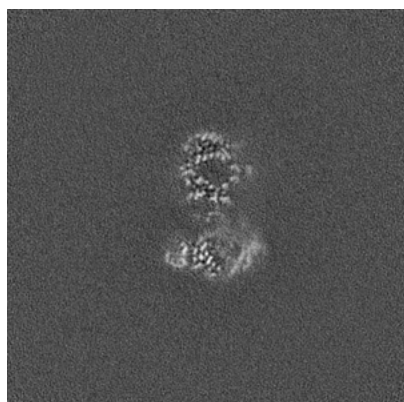


Y Index: 152

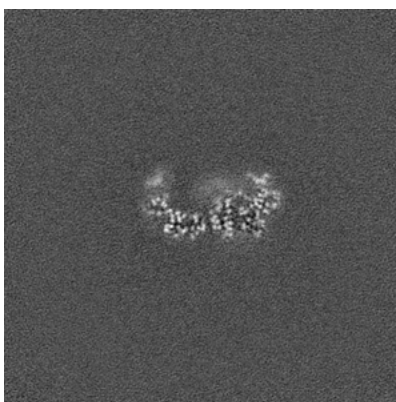


Z Index: 123

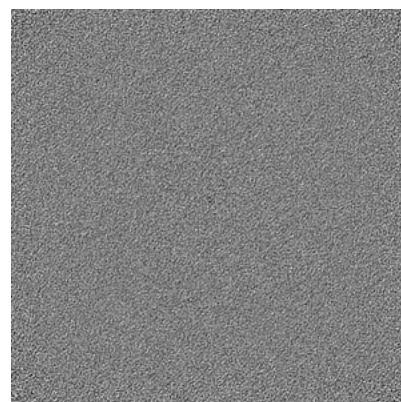
### 6.3.2 Raw map



X Index: 160



Y Index: 147



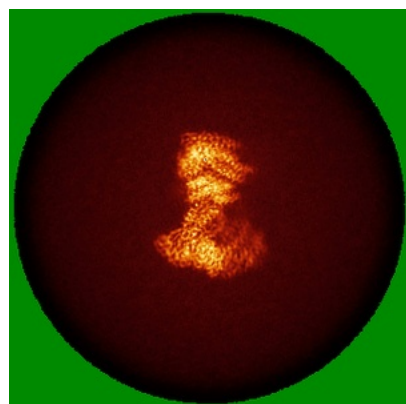
Z Index: 0

The images above show the largest variance slices of the map in three orthogonal directions.

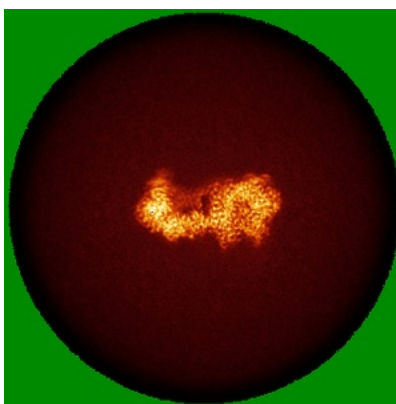


## 6.4 Orthogonal standard-deviation projections (False-color) [i](#)

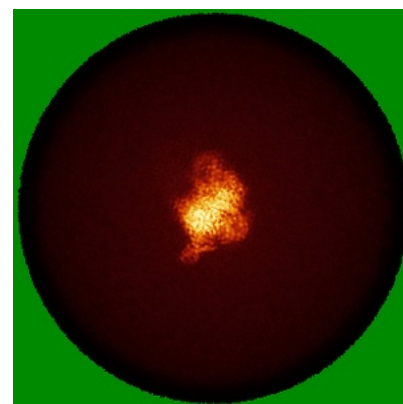
### 6.4.1 Primary map



X

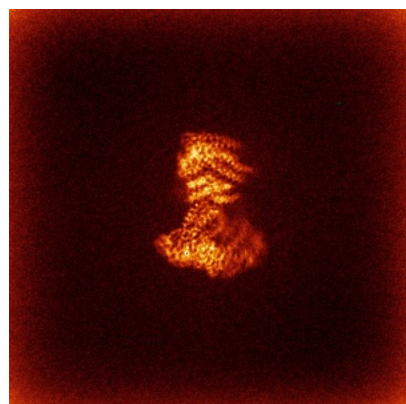


Y

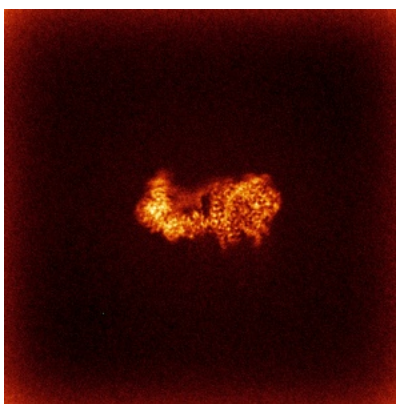


Z

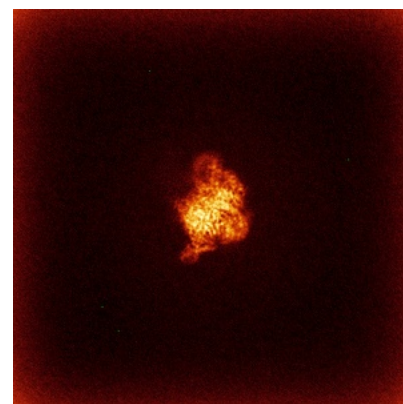
### 6.4.2 Raw map



X



Y

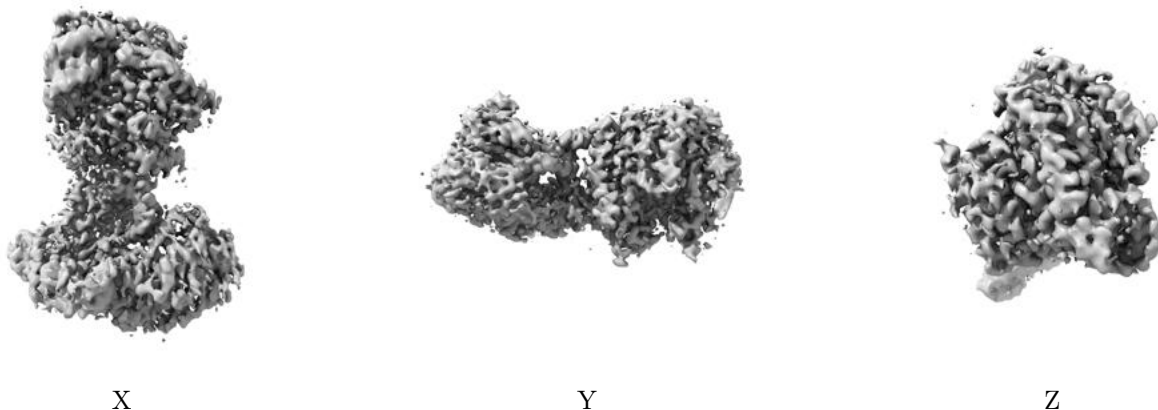


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

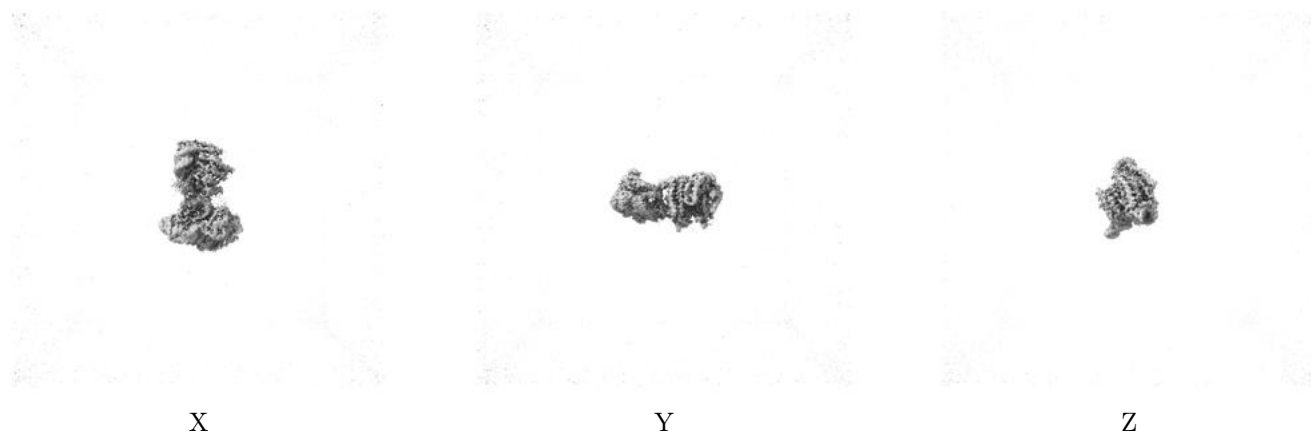
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.2. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

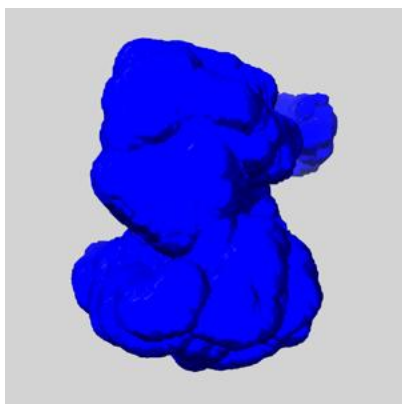
## 6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

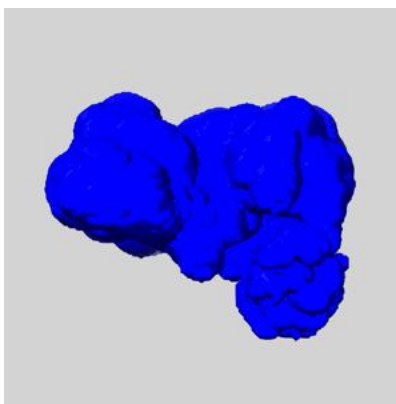
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

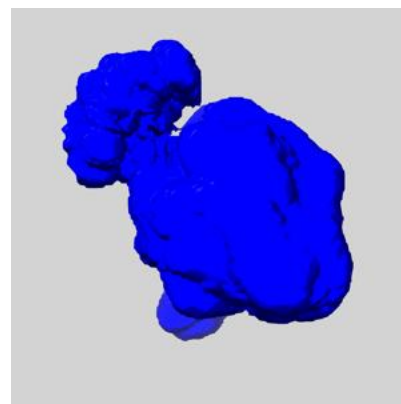
### 6.6.1 emd\_42079\_msk\_1.map [i](#)



X



Y

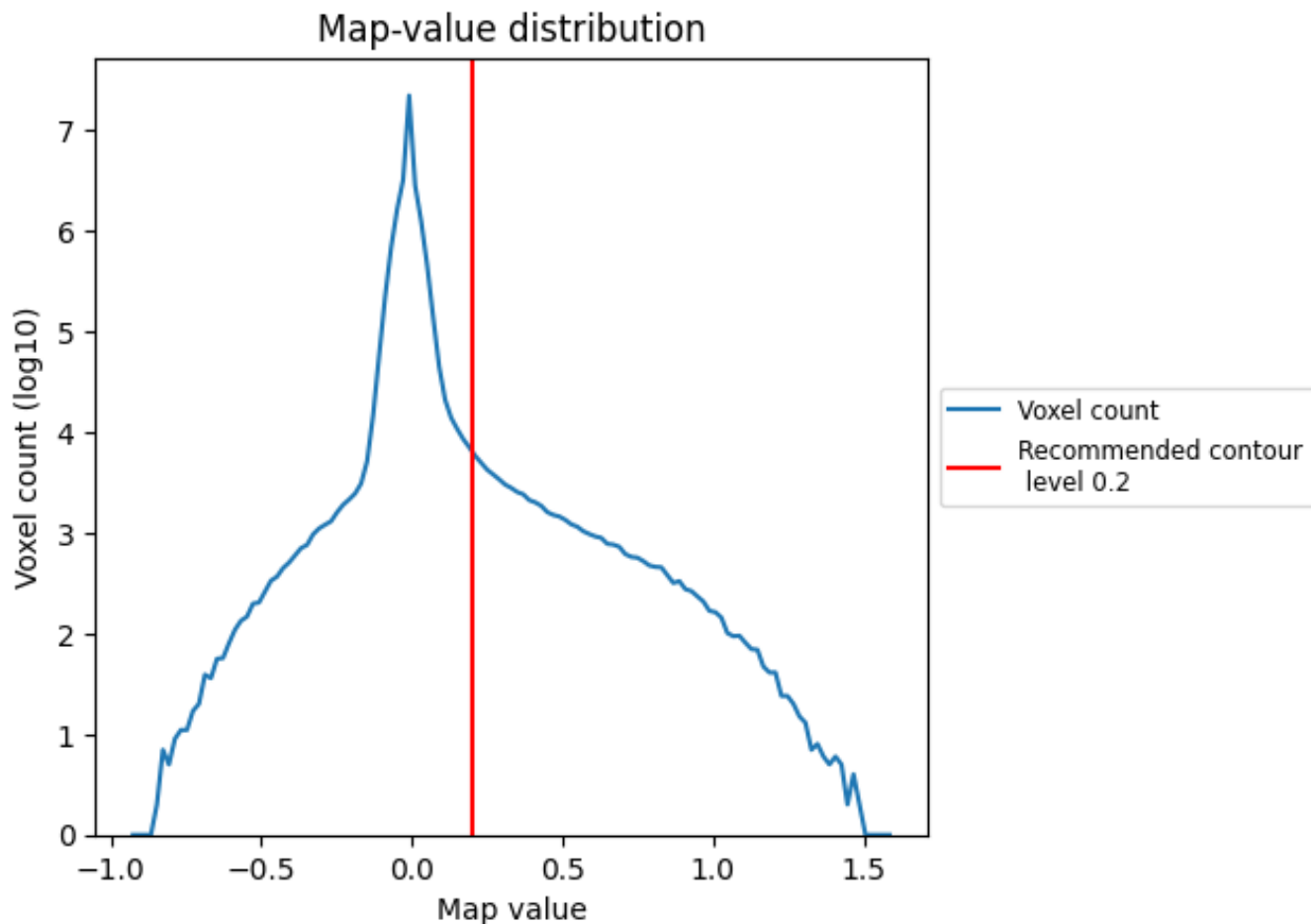


Z

## 7 Map analysis [i](#)

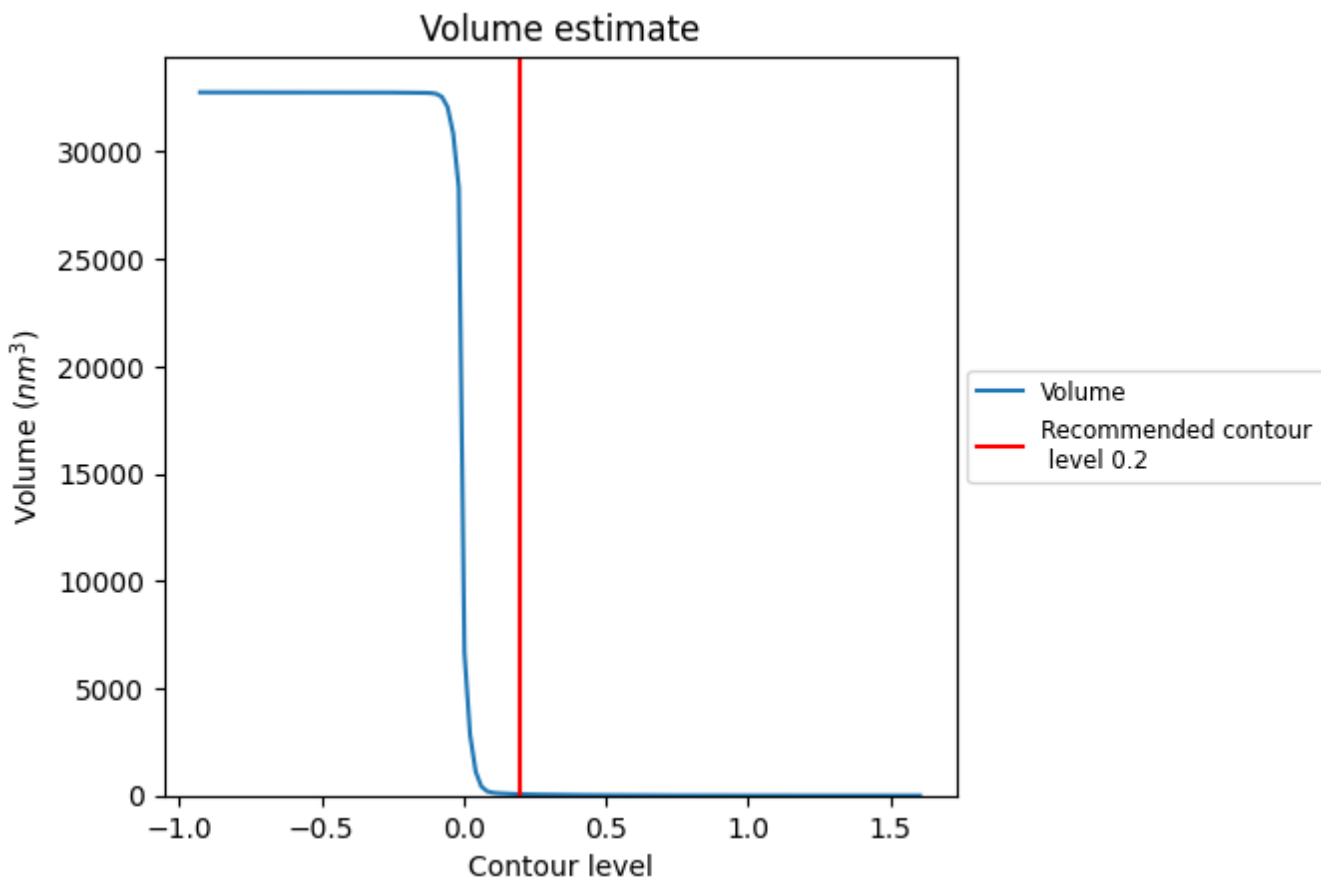
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

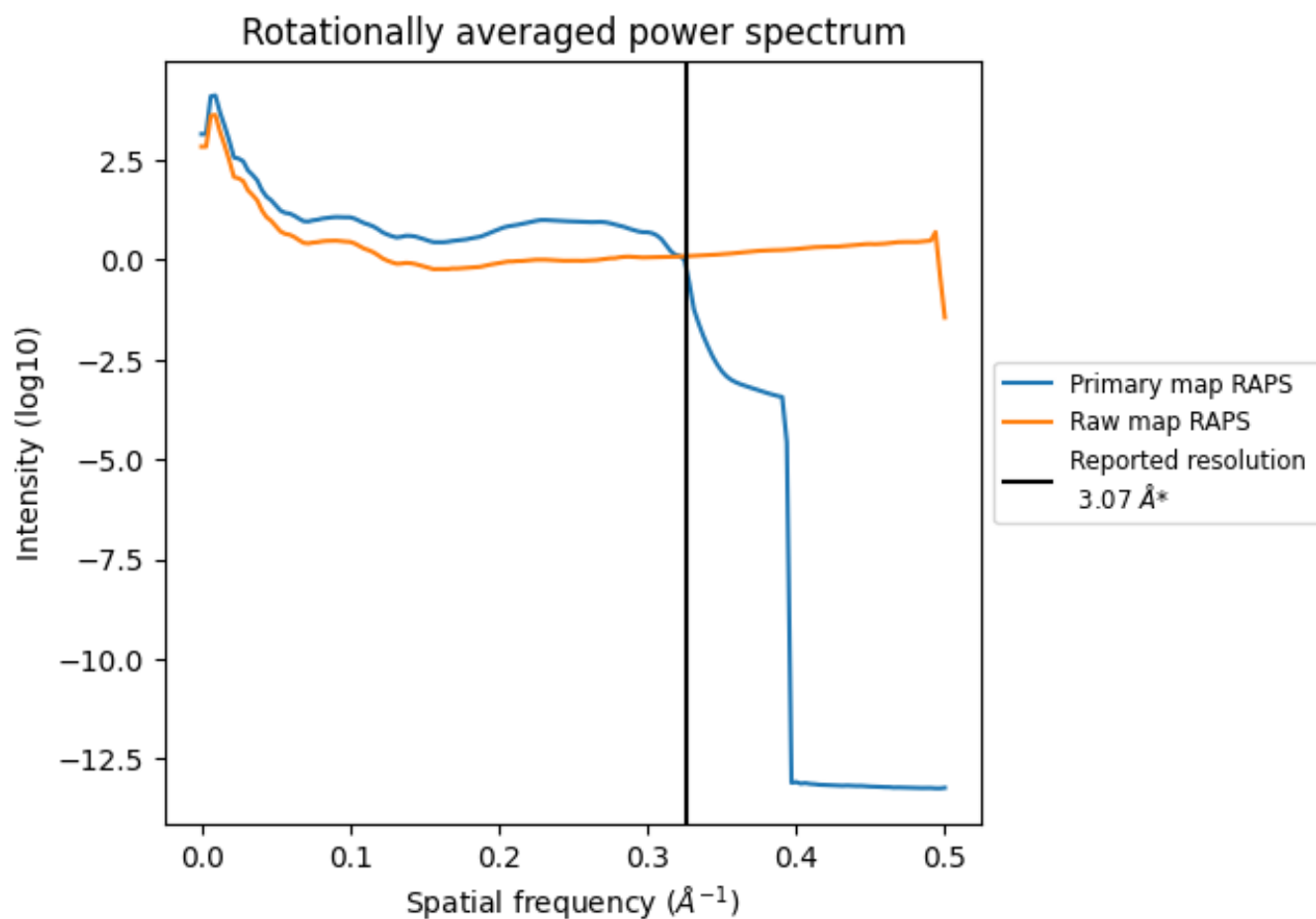
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is  $64 \text{ nm}^3$ ; this corresponds to an approximate mass of 57 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

### 7.3 Rotationally averaged power spectrum i

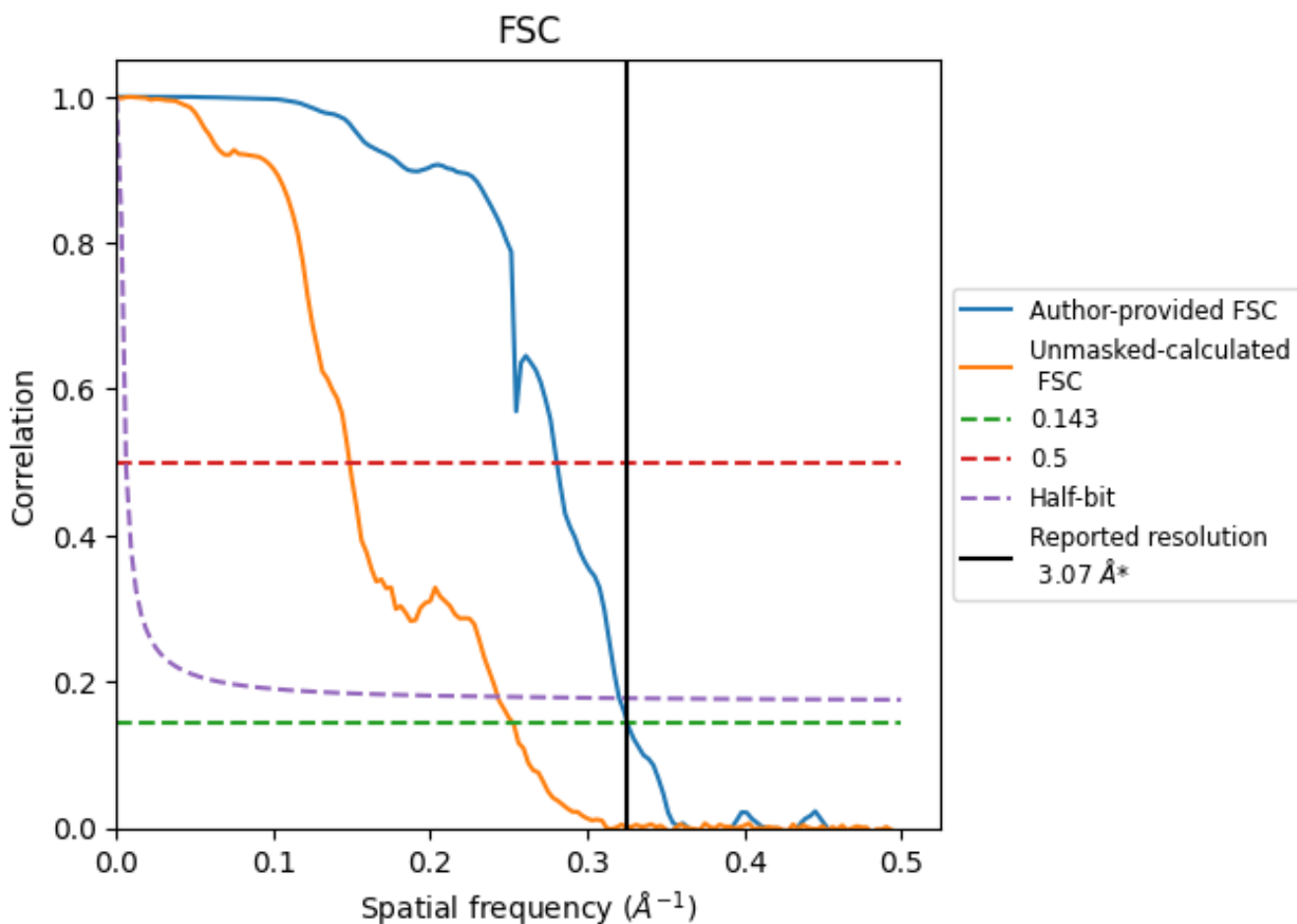


\*Reported resolution corresponds to spatial frequency of 0.326 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of  $0.326 \text{\AA}^{-1}$

## 8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.07	-	-
Author-provided FSC curve	3.07	3.56	3.12
Unmasked-calculated*	3.95	6.73	4.12

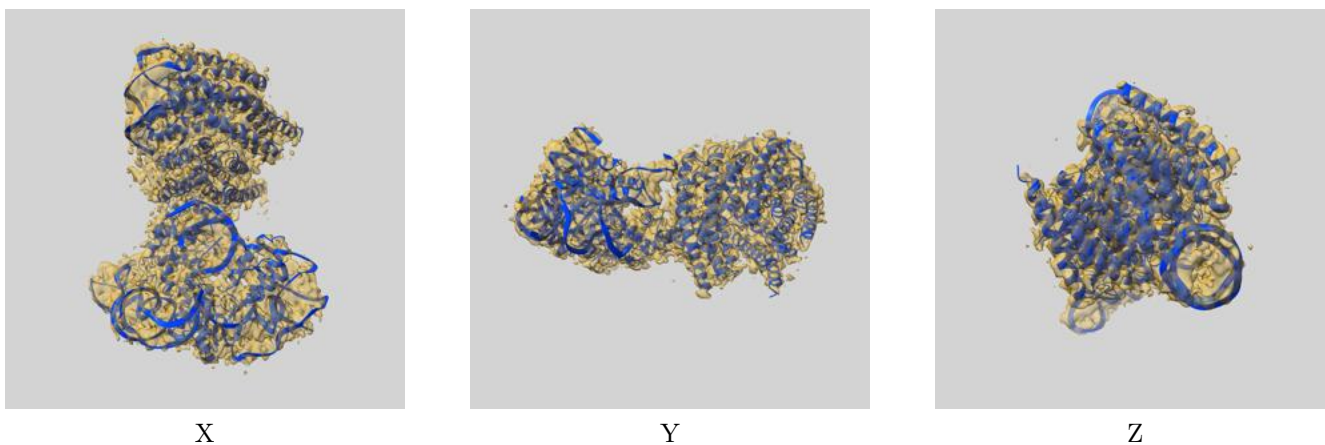
\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.95 differs from the reported value 3.07 by more than 10 %



## 9 Map-model fit [i](#)

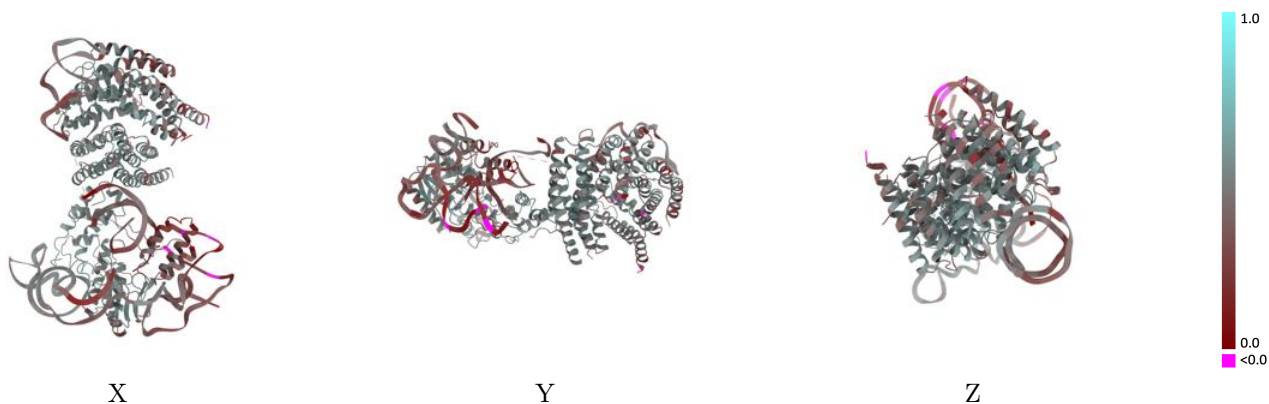
This section contains information regarding the fit between EMDB map EMD-42079 and PDB model 8UB9. Per-residue inclusion information can be found in section 3 on page 6.

### 9.1 Map-model overlay [i](#)



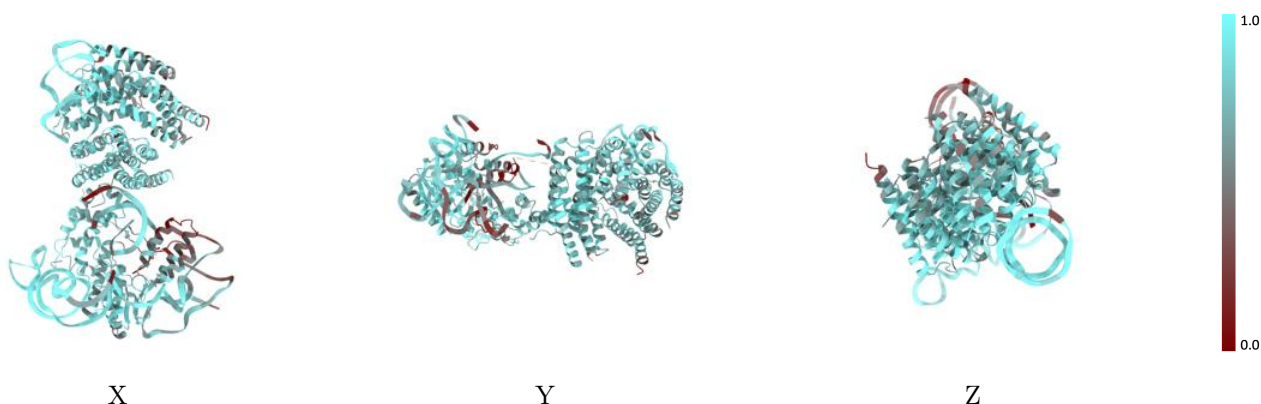
The images above show the 3D surface view of the map at the recommended contour level 0.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model [i](#)



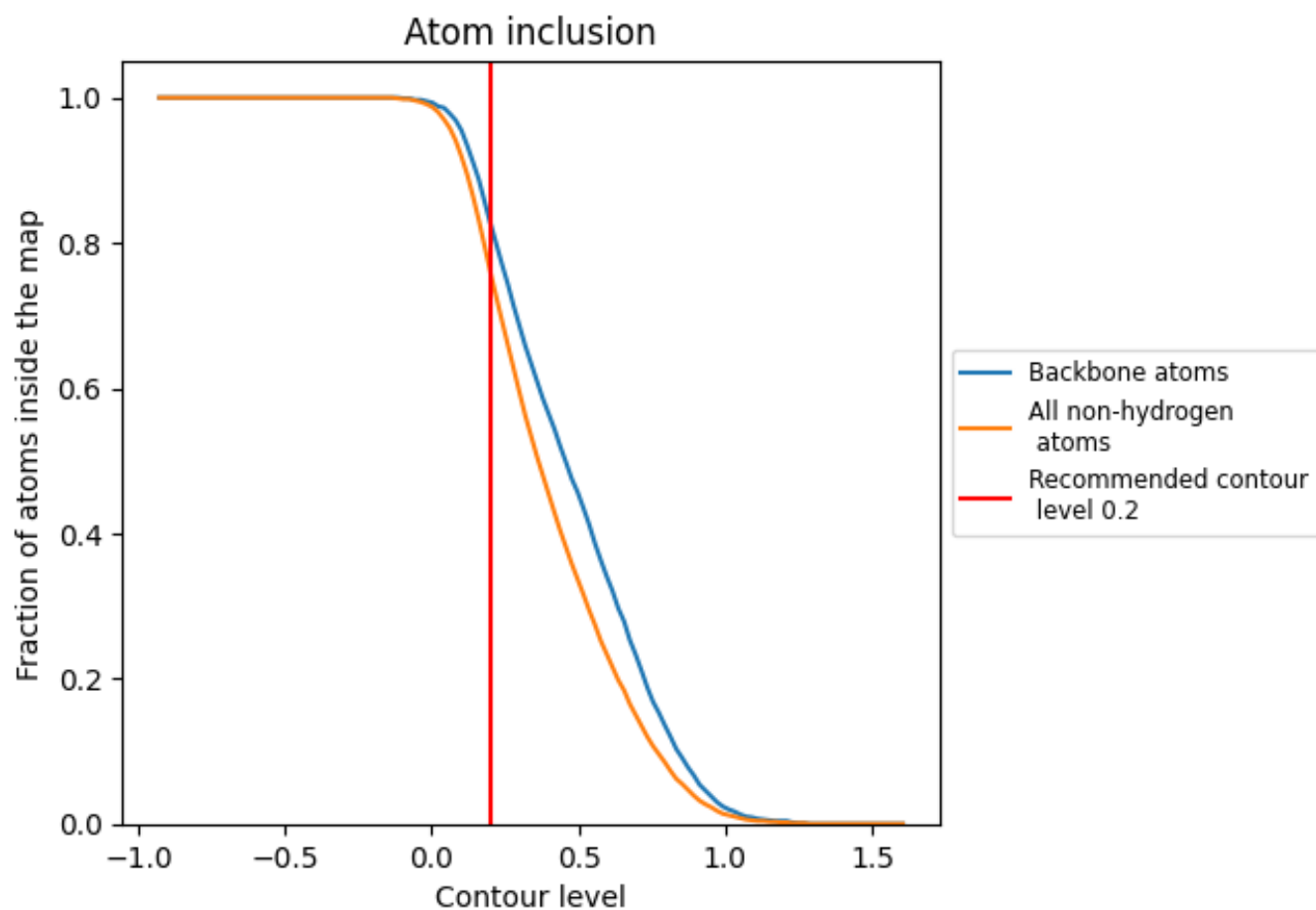
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

## 9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.2).





















## 9.4 Atom inclusion [i](#)



At the recommended contour level, 83% of all backbone atoms, 76% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7600	 0.4420
A	 0.7460	 0.4730
B	 0.8100	 0.5100
C	 0.8210	 0.5190
D	 0.7650	 0.4730
E	 0.7680	 0.4640
F	 0.7510	 0.4510
G	 0.5260	 0.1750
H	 0.6150	 0.3030
I	 0.7750	 0.3830

